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A METHOD OF PRODUCING INSULATED TEXTILE FABRIC

Field of the Invention

5 This invention relates to insulated textile fabrics and methods of making the same.

Background of the Invention

Some countries may experience harsh winter conditions whereby the temperature of open areas can fall as low as -30°C . While buildings are equipped with internal heating, the temperature in the open areas can be unbearable and necessitates the need of winter clothing with good insulation. Some buildings of the developing countries are not equipped with such internal heating and will have to depend solely on winter clothing or blankets to provide warmth to the residents of the buildings. Although wool is commonly used for as clothing insulation material, some citizens of the developing countries that experience such harsh winters cannot afford to purchase such materials. Thus, in the open, they are left to expose themselves to such harsh weathers without any proper insulating clothing which can be detrimental to their health and in some circumstances may even cause death.

20 Summary of the Invention

While polymers of different types have been used and patented for multifaceted applications such as water proofing using polyurethane, resin reinforcement of fabrics, textile fabric composites for belts, and even cold vulcanised rubber sheets for hospitals, the object of the present invention is to provide textile fabrics for the manufacture of apparels with good insulation against cold temperatures and a method of producing such insulated textile fabrics. Such textile fabrics can be used to produce any kind of apparel such as winter clothing, cloaks, shawls, mittens, dresses, coat and even blankets that can be used in cold weather conditions or where warmth is required.

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According to the invention, sulphur vulcanizable elastomers in latex form are used as the insulating material and are either sprayed on the textile fabric or the textile

fabric is dipped in the sulphur vulcanizable elastomers. The coated textile fabric is then subjected to drying and vulcanisation to provide a layer of elastomer insulation on the textile fabric. The insulated textile fabric is then converted into apparels for use in cold weather conditions or where warmth is required. This method permits low cost production of insulated textile fabrics and hence affordable insulated apparels can be made available for the developing countries. Such insulated textile fabric can also be advantageously used by the affluent sectors depending on the cost of fabrics used.

Detailed description of the invention

10 The term textile fabric as used herein includes and is not limited to knitted articles, threads, yarns, ropes, fibrous articles, natural or synthetic fibres, silks, cotton, satin and are not limited to any form of textile material.

 For the purpose of this invention, references to apparels relate to any kind of clothing, socks, headgear and coverings for human use.

 Sulphur vulcanizable elastomer in the latex form; either prevulcanized latex or compounded latex, both natural and synthetic including nitrile, styrene butadiene rubber (SBR), or neoprene latex and or modifications thereof, is used in producing the insulating textile fabric. One embodiment of producing the insulating textile fabric is to spray the sulphur vulcanizable elastomer on both sides of the textile fabric and placed in a hot chamber for drying and vulcanisation. The textile fabric is impregnated with a layer of vulcanised elastomer which is the insulation layer at the end of the vulcanisation. A second embodiment of producing the insulating textile fabric is to dip the textile fabric into the sulphur vulcanizable elastomer in a uniform manner. The dipped textile fabric is then placed in a hot chamber for drying and vulcanisation. A layer of insulation is impregnated on the surface of the textile fabric at the end of the vulcanisation. The thickness of the insulating layer can be varied by controlling the amount of elastomer latex incorporated into the textile fabric, thereby varying the amount of insulation on the textile fabric for use in different weather conditions. The temperature in the hot chamber and the drying time varies according

to the thickness of the vulcanizable elastomer and is adjusted accordingly to avoid any form of ageing or oxidation of the elastomer.

5 When the textile fabric is suitably impregnated with the sulphur vulcanizable latex, dried and vulcanised, it can then be converted into apparels for use in cold weather conditions or where warmth is required. The insulated textile fabric may also be encased in a suitable fabric before conversion to apparels to avoid direct contact of the elastomer with the skin.

10 It will be apparent to a person skilled in the art that the method and its specific embodiments may be varied or modified without departing from the methods or principles of working herein. These and other such embodiments not specifically determined herein are not to be considered as departures from the present invention and shall be considered as falling within the letter and spirit of the following claims.

Claims

What is claimed is:

- 5 1. A method of manufacturing insulating textile fabrics consisting of spraying sulphur vulcanizable elastomer on both sides of a textile fabric and heat drying the textile fabric to allow vulcanisation.
- 10 2. A method of manufacturing insulating textile fabrics as claimed in claim 1 wherein the sulphur vulcanizable elastomer is selected from prevulcanized latex.
- 15 3. A method of manufacturing insulating textile fabrics as claimed in claim 1 wherein the sulphur vulcanizable elastomer is selected from compounded latex.
4. A method of manufacturing insulating textile fabrics as claimed in claims 1 to 3 wherein the sulphur vulcanizable elastomer insulated textile fabric is further encased in a suitable fabric.
- 20 5. A method of manufacturing insulating textile fabrics consisting of dipping a textile fabric into sulphur vulcanizable elastomer in a uniform manner and heat drying the textile fabric to allow vulcanisation.
- 25 6. A method of manufacturing insulating textile fabrics as claimed in claim 5 wherein the sulphur vulcanizable elastomer is selected from prevulcanized latex.
- 30 7. A method of manufacturing insulating textile fabrics as claimed in claim 5 wherein the sulphur vulcanizable elastomer is selected from compounded latex

8. A method of manufacturing insulating textile fabrics as claimed in claims 5 to 7 wherein the sulphur vulcanizable elastomer insulated textile fabric is further encased in a suitable fabric.
- 5 9. An apparel made from insulating textile fabrics manufactured from any of the methods stated in claims 1 to 8.

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁷: D06M 15/693

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: D06M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 443 458 A (PERCY HERBERT HEAD) 26 March 1936 (26.03.1936) <i>page 1, lines 17-103.</i>	1-4
X	GB 405 970 A (PERCY HERBERT HEAD) 14 February 1934 (14.02.1934) <i>page 1, lines 28-85.</i>	1, 3, 4, 9
X	GB 448 711 A (INTERNATIONAL LATEX PROCESSES LIMITED et al.) 9 July 1936 (09.07.1936) <i>page 2, lines 59-65, 85-103, page 3, lines 35-57.</i>	5-7, 9

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 617 585 A (Fons et al.) 8 April 1997 (08.04.1997) <i>column 5, line 27 - column 6, line 41, figures 1-4.</i> --	5, 8, 9
X	GB 649 094 A (WINGFOOT CORPORATION) 17 January 1951 (17.01.1951) <i>page 1, lines 50-72, page 2, lines 39-44, 92-112, page 2, line 124 - page 3, line 9.</i> -----	1, 3, 5, 7, 9

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
GB	A	405970	1934-02-14	none			
GB	A	443458	1936-02-28	none			
GB	A	448711	1936-06-15	FR	A	799777	1936-06-19
				US	A	2096753	1937-10-26
				NL	C	42958C	0000-00-00
GB	A	649094	1951-01-17	DE	C	898962	1953-12-07
				US	A	2575577	1951-11-20
				NL	C	68789C	0000-00-00
US	A	5617585	1997-04-08	none			